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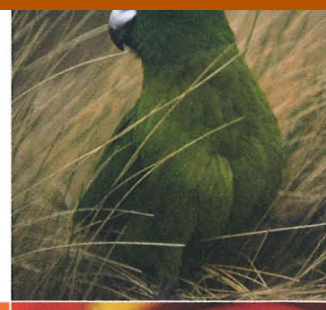

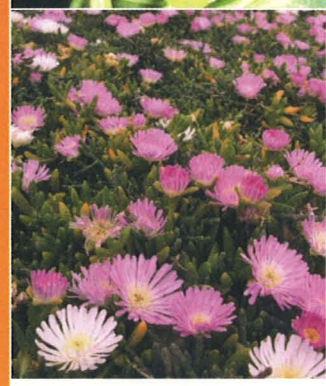

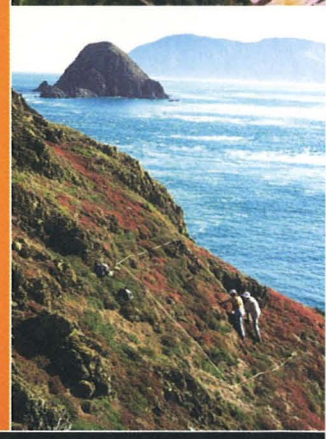

Lake Rotokare Scenic Reserve Invertebrate Ecological Restoration Proposal

Mike Bowie

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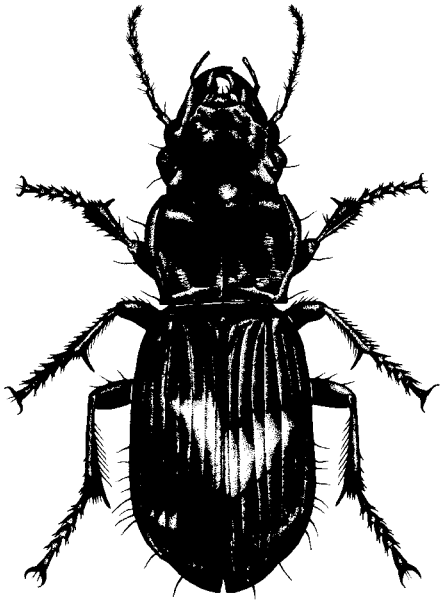

Prepared for:

Lake Rotokare Scenic Reserve Trust

October 2008

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1. Introduction

Rotokare Scenic Reserve is situated 12 km east of Eltham, South Taranaki, and is a popular recreation area for boating, walking and enjoying the scenery. The reserve consists of 230 ha of forested hill country, including a 17.8 ha lake and extensive wetland. Lake Rotokare is within the tribal area of the Ngati Ruanui and Ngati Tupaea people who used the area to collect food. Mature forested areas provide habitat for many birds including the fern bird (*Sphenoeacus fulvus*) and spotless crake (*Porzana tabuensis*), while the banded kokopu (Galaxias fasciatus) and eels (*Anguilla australis schmidtii* and *Anguilla dieffenbachii*) are found in streams and the lake, and the gold-striped gecko (*Hoplodactylus chrysosireticus*) in the flax margins. In 2004 a broad group of users of the reserve established the Lake Rotokare Scenic Reserve Trust with the following mission statements:

- "To achieve the highest possible standard of pest control/eradication with or without a pest-proof fence and to achieve a mainland island"
- "To have due regard for recreational users of Lake Rotokare Scenic Reserve"

The Trust has raised funds and erected a predator exclusion fence around the 8.4 km reserve perimeter. An intensive trapping programme since 2004 has eradicated more than 4,000 pests and an aerial poisoning operation is to be undertaken in July/August 2008 in an attempt to completely eradicate all mammalian pest species. It is hoped that all pests, including mice, can be eradicated from within the predator fence and the reserve maintained as a predator-free refuge for indigenous flora and fauna to flourish. Predator-free islands and intensively managed 'mainland islands' have shown that indigenous birds, lizards and invertebrates can thrive given all the habitat requirements. Lake Rotokare Scenic Reserve contains sufficient quality forest habitat to sustain a healthy invertebrate community and if the Trust could achieve and maintain pest-free status, the reserve could realise its full potential as a wildlife sanctuary.

The reserve is currently classified as a scenic reserve, but as predators are removed from within the predator fence it may be advantageous to change management status to that of an open sanctuary category (Towns et al. 1990). This classification will bring lots of challenges balancing conservation and restoration of the ecosystem with public recreation. Public use will bring with it the real threat of rodent reinvasion. Mice in particular have proven to be the most difficult of all mammals to eradicate, let alone prevent reinvasion, regardless of the new predator exclusion fence technology.

The aim of this report is to assess the potential for invertebrate restoration at Lake Rotokare Scenic Reserve and to recommend a plan of action.

2. Invertebrates

The invertebrate fauna provides the greatest contribution to biodiversity in terrestrial communities, and is a critical component of their ecology (Hutcheson et al. 1999; Grove and Stork, 2000). However, invertebrates are often the forgotten fauna (Gibbs, 1990; Bowie, 2002) in ecological restoration programmes yet their role in pollination, nutrient cycling, seed dispersal, food for vertebrates and other invertebrates suggests that they should not be overlooked when managing ecosystems (Bowie et al. 2003). Many invertebrates have become extinct or endangered due to deforestation, farming practices and the introduction of predators (including hedgehogs, rats, mice, mustelids and cats) (Wells et al. 1983). Large flightless invertebrates are particularly vulnerable to local extinction, because their typical nocturnal behaviour exposes them to mammalian predators, and their poor dispersal powers hinder reestablishment of populations (Lövei and Cartellieri 2000). Although many flighted insects can self recolonise in time, larger flightless invertebrates without vegetative corridors will need human intervention. Translocations are an option if species are known to have once occurred at the target restoration site and a healthy local source population is available. However there are many issues to consider and years of planning in preparation for such an operation is required. The local Department of Conservation conservancy needs to be involved and extensive consultation must be undertaken with local users of Lake Rotokare, including local iwi.

2.1 Current situation

Little is known about the invertebrates at Lake Rotokare other than the survey carried out (December 2003-February 2004) by Ian Stringer (see Appendices 12.2). Additional pitfall trapping and flight intercept trapping has been carried out by Dr Steve Pawson (December 2007-January 2008) but the invertebrate contents of the traps await identification. There has been very little published historic invertebrate collecting from the Lake Rotokare vicinity to provide evidence of species that were once present.

2.2. Invertebrate inventories

It is very difficult to make decisions on what species should be reintroduced without knowing with certainty that they are locally extinct from Lake Rotokare. In light of recent aerial eradication programme for rodents, it may be wise to resample the invertebrate fauna given the predatory behaviour of rats and mice (Bremner et al. 1984; Marris, 2000). The Department of Conservation (DoC) do not consider eradication programmes are successful until rigorous monitoring at least two years after operation show no signs of the pest species. Rare invertebrates may take another three to ten years to become sufficiently abundant to be detected after predator pressure has been removed. One aspect that needs to be considered is the cost invertebrate species introductions. Collection of invertebrate material is the easy part but identification is time consuming and often specialist taxonomists need to be used at significant cost.

2.3 Sampling methods

Destructive sampling methods such as pitfall trapping and Malaise trapping are still the best method for surveying the broad species present but are not ideal when sampling rare and endangered species.

Dragonflies and damselflies are important components of an aquatic ecosystem and because they are easy to see and identify makes them a good indicator species to monitor health of aquatic ecosystems (http://watermonitoring.uwex.edu/wav/monitoring/coordinator/ecology/odonata.html). New Zealand dragonfly species can be identified using Rowe (1987).

A moth survey through light-trapping at different times in the summer is recommended. Not only will this help with an inventory of moths, they are also useful indicators of restoration success (Lomov et al. 2008). Light-trapping is also a useful technique for collecting adult aquatic invertebrates. It maybe useful to canvas university entomologists for potential student projects monitoring or surveying the invertebrate fauna.

3. Restoring invertebrate communities

Lake Rotokare has the advantage of starting with some quality intact forest whereas as many other ecological restoration projects start from low or poor native plant diversity. The removal of possum, rabbits and rodents will significantly encourage native plant regeneration.

Invertebrate species do not have the same impact with the public that vertebrates such birds and lizards enjoy (Nash, 2004). Larger invertebrates such as weta are easier to 'sell' to public than smaller, lesser known species due to their iconic nature. However, restoring invertebrate communities is not just about looking after the large iconic 'showy' species, but also the invertebrate species that contribute to ecosystem function that are the 'drivers' of processes such as the soil aeration, litter decomposition, nutrient cycling, pollination, seed dispersal, herbivory and food sources for birds, lizards and other invertebrates. It is therefore important as a Trust to set clear and achievable goals that identify the desired outcomes in terms of invertebrate restoration. The restoration efforts for the plant biodiversity are also inextricably associated with invertebrates. Consideration should be given to habitat corridors within the reserve and possibly from the reserve to other areas of high endemic biodiversity (Samways, 2005). The provision of sufficient Coarse Woody Debris (CWD) as a microhabitat for saproxylic Coleoptera (beetles dependant of dead wood) and other species (such as carabids, Onychophora, snails, leaf-vein slugs) that are found under logs on the forest floor is extremely important (Grove, 2002). The CWD produced by large mature trees offer the best refuges for invertebrates, so only the areas where selective felling of large trees has occurred and recently donated grazed land may be without these suitable logs. The use of wooden discs (Bowie and Frampton, 2004) could be used as surrogate logs in such areas, so any exotic trees in the reserve could be sacrificed for this purpose.

Factors affecting reintroduction success and failures are poorly understood (Scott and Carpenter, 1987, Griffith et al. 1989, Armstrong et al. 1994, Sherley, 1994) and the need to have good scientific design in restoration monitoring is important to understanding the success of programmes in the long-term (Gibbs, 1990; Armstrong et al. 1994; Atkinson, 1994; Watts and Thornburrow, 2008). Non-destructive methods of monitoring are obviously advantageous and can often double as a restoration technique for providing habitat or a safe refuge e.g. weta motels for tree weta species (Bowie et al. 2006), spiders (Hodge et al. 2007), or wooden discs for leaf-vein slugs and carabidae (Bowie and Frampton, 2004; Bowie and Vink, 2006; Bowie, 2007). Other methods such as tracking tunnels are safe and extremely useful for detecting the presence of threatened species such as giant weta (Watts et al. 2008). Tracking tunnels should be used routinely as one of many methods for rodent detection and can also be used for species such as giant weta if peanut butter is used as an attractant.

3.1 Identification of potential species

Potential candidate species for re/introduction could be of two broad types:

1. species once thought to have been present at Rotokare.
2. species of significant conservation value (Hitchmough et al. 2007) that would gain advantage from the transfer to a predator free sanctuary.

3.2 Identification of source populations

It is desirable for populations used in translocations to be sourced from the same ecological region, closest location geographically, and/or climatically to Lake Rotokare so as to reduce stress and keep the local genetic traits intact.

In selecting a population for reintroduction into an area it is preferable to choose a population that is healthy and has not gone through a genetic bottle-neck or inbreeding (Jamieson et al. 2008). Conversely, out-breeding depression as a result of genetically distantly related populations can result in low vigour and eventual population collapse.

3.3 Numbers and demographics

The best source of information in New Zealand for this is in the "Reintroduction projects in New Zealand" website setup by McHalick (1998) and maintained by Doug Armstrong at Massey University (http://www.massey.ac.nz/~darmstro/nz_projects.htm).

There is no right number to translocate as it will depend on each species and their sexual/reproductive strategies. Perhaps the main consideration is how abundant are the target invertebrates at the source site as you need to convince the DoC that there will be no adverse effect from where they are removed. Only twenty-six slugs and 32 eggs of leaf-vein slugs were translocated to Quail Island (Bowie, 2008), however a population was still healthy after four years. As this species is a hermaphrodite, fewer specimens are likely to be needed to establish a viable population than with solely sexual species. Two successful reintroductions of giant weta (*Deinacrida rugosa*) to Mana and Matiu-Somes Islands used 43 and 34 weta respectively.

4. Iconic species

It is important to have iconic species to stimulate interest, educate public and provide a focus to conserve and restore habitats in projects like the Lake Rotokare Scenic Reserve. To get 'buy in' from public, users and funding agencies it is nice to show that specific species are present and are increasing in numbers and/or distribution. Iconic invertebrate species are usually rare, threatened, unusual or endemic to the area and large. Weta are the flagship group for invertebrate conservation in New Zealand (New, 1995a) and perhaps because of this have attracted funding leading to successful translocations. Without a comprehensive survey of the Lake Rotokare invertebrates it is not easy to decide on such a flagship species but if onychophora are still present, which is likely, then they are a good species for this role. Other possible species may be weta species or snail species.

4.1 Onychophora

The Onychophora (velvet worm or Peripatus) species *Peripatoides suteri* has been collected from Lake Rotokare and could be the reserve's biggest invertebrate asset. Considered 'living fossils' (Gleeson, 1996), they warrant high conservation status (New, 1995b) as Onychophora are listed as 'vulnerable' in the IUCN Red Data Book (Wells et al. 1983). Two individuals of *P. suteri* were collected under a log from Lake Rotokare (39°27'S, 174° 24'E) in 1995/1996 (Trewick, 1998). This species can vary in size from 14-90 mm in length, but its 16 pairs of ambulatory legs make it distinctive from other species which have 15 pairs. Although *P. suteri* is also known from other areas including Whakapapa, Coromandel and Waitakere Ranges (http://www.landcareresearch.co.nz/research/biosystematics/invertebrates/onychophora/taxonomy.asp#2Peripatoides_suteri), it is considered rare outside the Mt Taranaki area (Dawson Falls and Lake Rotokare; Trewick, 2000). Onychophora lives in moist microhabitats including in or under rotten logs, leaf litter and stones (Gleesen, 1996). Onychophora are nocturnal predators and they capture their prey by squirting a sticky substance from a modified pair of limbs either side of their head.

4.2 Snails

Many indigenous snail species are likely to be present at Lake Rotokare Scenic Reserve, but if the larger *Powelliphanta* species were present then this would be of significant interest. *Powelliphanta* "egmont" has been collected on the north side of Mt Taranaki and known from Makakaho, east of Lake Rotokare. Given this distribution it is likely that this 'species' was once found at Lake Rotokare, but has become extremely rare or locally extinct due to predation by possums and birds such as the thrush (McGuinness, 2001).

4.3 Giant weta

The Cook Strait giant weta *Deinacrida rugosa* (Meads and Notman, 1995) is a species that could be introduced into the area if there is evidence to suggest it was once present at Lake Rotokare. Sir Walter Buller first described the species from a specimen found in a burrow in the Wanganui area (Hamilton, 1913), so there is some evidence that it occurred relatively close by to the south east.

5. Pest species / threats to invertebrate restoration

One thing to carefully consider is the threat of bird species on invertebrates. The morepork (*Ninox novaeseelandiae*) is a significant predator of weta (Haw et al. 2001) and timing and location of release site should be carefully chosen to reduce potential predation by owls. The introduction of weka (*Gallirallus australis*) to Rotokare Scenic reserve should be considered very carefully. Although they may be considered a historical and cultural part of the area, they are predators of most large-sized invertebrates and would be very disruptive to any arboreal invertebrate conservation (Meads and Notman, 1995).

Although mice are only one of the target pests to eradicate, history shows that they are the most difficult to eradicate and a real reinvasion threat. In the event that this occurs, it must be realised that in the absence of other larger predators (e.g. rats, cats and mustelids), mice density will increase quickly to a level that can cause significant predation on invertebrate populations (Courchamp et al. 1999; Sweetapple and Nugent, 2005; Bowie, 2008). Ongoing strategies may be needed using trapping or poisoning to either eradicate invaders or keep pests within the fence at an ecologically sustainable level. In both scenarios invertebrates will consume cereal baits and although they may not have any short-term effects, consideration should be given to the possibility of secondary poisoning from birds eating invertebrates such as weta (Bowie and Ross, 2006).

Ants such as the Argentine ants are a huge threat to the ecosystem (Harris, 2002) and like most pests, they will be easier to prevent their invasion than to eradicate once they have established. Potted trees brought in for restoration plantings should be carefully checked for ant activity as an ant colony could easily be present in pots, as has been known to happen. Poison ant baits should be used at the plant nursery prior to transportation to Lake Rotokare and before planting to avoid possible introduction of ant pests. Hoffman and O'Conner (2004) have successfully eradicated two pest species of ants from Kakadu National Park but state that public awareness was the vital part of the eradication programme. So it would be in the best interest of the Trust to ask planters, workers, council and public to keep their eyes open for the ants (check out the information on the web e.g. http://www.forestandbird.org.nz/biosecurity/argentineants/factsheet.pdf).

German wasps are a threat to any native terrestrial ecosystem and should be kept to low numbers as high densities of exotic wasps can significantly impact invertebrates and birds (Beggs, 2001). The absence of beech (*Nothofagus*) and associated honey-dew producing scale insects will help this cause.

Whitetail spiders do not offer a significant threat to humans (Banks et al. 2004), but may pose an ecological threat to other native spider species. Due to the public use of the area, it maybe difficult to prevent the colonisation of this species, and may already be present.

6. Translocation protocols

This is a relatively new science and few protocols exist. Each species / taxon may need a specific technique which aims to mimic the micro-habitat at the source population site.

There is a standard DoC protocol / application to translocate flora and fauna, including invertebrates although these are currently under review (see appendices 12.3). The documents in the appendices will give a sense for what planning is required when undertaking a translocation. It is recommended that if or when the Trust intends to translocate species that they contact the Coordinator for the Translocation SOP at the Department of Conservation for an up to date protocol. Pam Cromarty is currently the coordinator and can be contacted by email (*pcromarty@doc.govt.nz*).

Reintroduction projects in New Zealand along with the specific methods used are documented on the very useful Massey University web site (http://www.massey.ac.nz/~darmstro/nz_projects.htm#speargrass_weevil).

6.1 Summary of the main recommendations for insect translocations – a code of conservation practice

(Adapted from: Campbell-Hunt, 2002; Joint Committee for the Conservation of British Insects, 1986; cited in New, 1995a)

Before

- Plan well ahead of time
- Consult widely (including iwi, DoC, experts) before deciding to attempt any re-establishment
- Every re-establishment should have a clear objective
- Know the ecology of each species to be re-established e.g. habitat, diet and ovipostion requirements
- Permission should be obtained to use both the receiving site and source of material for re-establishment
- The receiving site must be appropriately managed
- Specific parasites should be included in re-establishment e.g. mites naturally present on carabids
- The numbers of insects released should be large enough to secure re-establishment
- Understand the transfer techniques e.g. best time to use (when females are gravid)

During

- Minimise the time (and stress to invertebrates) between collection and release – keep them cool and captive time to a minimum
- Record age, sex, weight and other important parameters specific to the species

- Collect DNA of species (optional) – only where it is possible to do so without jeopardising the species' survival (e.g. use exuviae, eggs, frass). Store DNA in 100% ethanol in freezer.
- Mark adults with a permanent non-toxic pen or paint to enable identification of original population and dispersal (optional) – not possible with some species

After

- Details of the source locations and release should be meticulously recorded (including GPS locations)
- The success of relocation should be regularly monitored and adequately recorded
- All re-establishment should be reported (Translocation database at Massey University)
- DoC also like to keep records of translocation details and outcomes

7. Measuring restoration success

Beetles are have historically been used to assess invertebrate biodiversity as they are the species-rich fauna on earth, and beetles contribute more than 40% of all insect species in New Zealand (Marris, 2007). Ground beetles (Carabidae) have often been used as indicator species (Work et al. 2008; McGeoch, 1998) mainly because they are relatively easy to sample and identify, are diverse, and because of their large size are common prey for many of the introduced mammalian predators. The carabid's vunerability to predation by introduced mammals makes these taxa a good indicator to measure efficacy of eradication programmes. Although the greater Taranaki ecological area has 65 carabid species (Larochelle and Larivière, 2001) and Ian Stringer's pitfall trapping (see appendix) caught seven species at Lake Rotokare, it is likely that between 10 and 25 carabid species could be found at the reserve.

Evidence of increasing abundance and/or diversity is extremely valuable for funding applications, newsletters, advocacy, educational and scientific purposes. The use of a control monitoring site/s outside of the predator exclusion fence would be most useful in terms of comparison of fauna with and without the predators. The use of previous baseline trap locations by Ian Stringer and/or Steve Pawson would be recommended.

8. Educational opportunities

Education is an important component of restoration programmes. Public can be naïve about invertebrates and their role in the environment. Weta motels (Bowie et al. 2006) and wooden discs (Bowie et al. 2004) can be set up next to tracks and beside posters inviting people to check them out. Karori Reserve (Wellington) has multiple lockable motels of which only one or two can be opened on any given day. By using different motels each day the disturbance is kept to a minimum thus maintaining a high weta occupancy rate. Weta are not the only inhabitants of motels, spiders, leaf-vein slugs and *Artystona* species (Tenebrionidae) are common

occupants also (see pictures). Onychophora have also been observed using weta motels at Karori Wildlife Sanctuary (Al Check, pers. com. 2008).

Publicity however can be a double-edged sword (education versus intrusion/interference) with the translocation of iconic species such as giant weta in a public area. For such species, the location must be unknown to the public and release sites must be well away from human disturbance, but release sites must meet the species' habitat requirements.

9. Recommendations

- Identify invertebrates from pitfall and interception traps collected by Steve Pawson.
- Setup an intensive sampling programme to create an invertebrate inventory. Priority species include: light trapping for moths, hand searching for Onychophora, weta, snails, spiders, ground beetles (Carabidae) species.
- Setup a long-term monitoring programme that will enable changes in invertebrate abundance and diversity to be measured. This may include pitfall trapping (maybe able to include Ian Stringer's and/or Steve Pawson's previous sites as baseline measures), Malaise trapping, non-destructive monitoring techniques (e.g. wood discs or weta motels), and some aquatic sampling (from three or four of the streams). The more initial baseline data (i.e. sequential years monitoring), the easier it will be to show ecological changes. Control sites outside of the fenced area would be useful to include in your monitoring if resources allow.
- Wait! Do not do any reintroductions until you know exactly what is present at Rotokare Scenic Reserve. It may take up to ten years after mammal eradication before rare invertebrates are sufficiently abundant to be detected.
- *Peripatoides suteri* is the key iconic invertebrate species known to be present in the reserve. This species can possibly be used as a flagship species because of its rarity and vulnerability. This will be useful when applying for funding. Wooden discs and weta motel-like refuges should be used to help monitor *P. suteri* while providing additional habitat for them.

10. Acknowledgements

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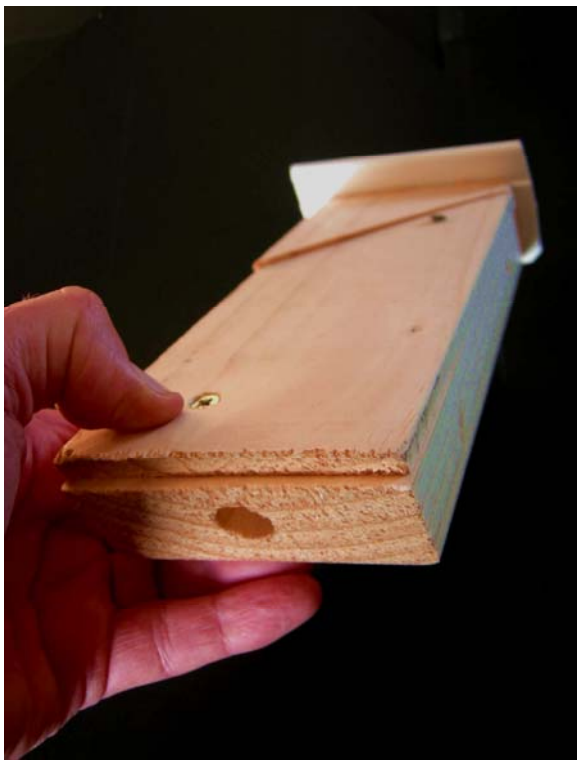
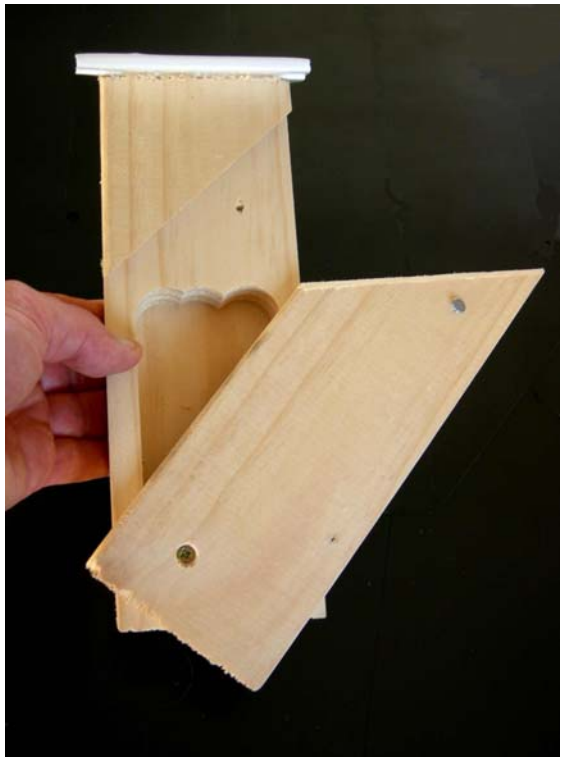
12. Appendices

12.1 Pictures of weta motels and wooden discs





Weta motels made from 10 x 4cm untreated pine

Wooden discs used for monitoring and restoration purposes

12.2 Ian Stringer's invertebrate sampling at Lake Rotokare 2003-4

			Lakeside				Entrance			
			18/12/03-15/01/04		15/01/04-12/02/04		18/12/03-15/01/04		15/01/04-12/02/04	
			c83	c134	c126	c369	c84	c132	c287	c350
Annelida						1	2			2
Gastropoda			2	3	8	2	2	5	4	14
Amphipoda			26	78	64	60	17	17	9	25
Isopoda			12	35	11	53	12	8	7	11
Chilopoda						2				
Geophilomorpha				1						
Diplopoda			15	60	16	54	21	28	12	24
Pseudoscorpionida			11	9	12	8	4	6	2	5
Opiliones			9	15	6	9	8	5		6
Araneida			18	28	64	39	41	10	15	20
Archaeognatha			3	1	8	1	6	4	3	5
Blattodea					3					
Lepidoptera			1			2	1		1	2
Psocoptera			3	1			1	1		1
Orthoptera			9	4	2		9	1	2	2
Hymenoptera			10	20	7	5	10	10	3	4
Formicidae			15	74	17	56	54	54	76	38
Hemiptera			3	6		3	2	6		3
Thysanoptera				4			1	19		
Larvae			4	12	11	6	22	44	12	29
Diptera	unknown				6	3		1		3
	Cecidomyiinae		1	4			1		2	
	Chironomidae		4	2		2	3	1		1
	Sciaridae			15	3	4	14	6	5	4
	Sciaridae	Corynoptera sp.	5				1			
	Sciaridae	Ctenosciara sp.	3			1				
	Sciaridae	*Epidapus parvus*	1				1			
	Sciaridae	Neopnyxia	1							
	Sciaridae	Pseudolycorella					23	2		1
	Psychodidae		1				6	5		1
	Bibionidae							7		
	Bibionidae	Dilophus sp.					2			
	Dolichopodidae		1							
	Empididae							1		
	Phoridae			2		1			2	
	Mycetophilidae	Tetragoneura	1							
	Keroplatidae	Macrocera					1			
	Syrphidae	*Milisca bilineata*		1						
	Sphaeroceridae		1	1	2	2			1	
	Sphaeroceridae	*Leptocera mediospinosus*					1			

			Lakeside				Entrance			
			18/12/03-15/01/04		15/01/04-12/02/04		18/12/03-15/01/04		15/01/04-12/02/04	
Coleoptera	unknown			1			1			
	Carabidae	*Ctenognathus* sp.					1		1	
		Gaioxenus pilipalpis					1			1
		Holcaspis sp.				1				
		Holcaspis mordax		1			1	4		1
		Mecodema crenaticolle					1	1		
		Pentagonica vittipennis?				1				
		Zolus?						1		
	Hydrophillidae	*Cercyon* sp.							1	
	Ptiliidae	Ptillidae sp.						2		
	Leiodidae	Cholevinae sp.	4	5			9	2		
		Inocatops?						1		
		Isocolon sp.						1		
		Zeadolopus sp.	5	9		2	7	5	2	4
	Scydmaenidae	*Adrastia sp.*	1	14	5	10	10	7	3	4
	Staphylinidae	Aleocharinae sp. 1			1		3	1		
		Aleocharinae sp. 2		4		2		1		
		Aleocharinae sp. 3							1	1
		Eupines/Euplectini	1	1			3	1		
		Hyperomma sp.1							1	
		Hyperomma sp. 2						1		
		Maorothius sp.					1	3		
		Microsilpha sp.	1							
		Osoriinae Paratrochus?		2		3				
		Pselaphine/Eupines/Anaba	1	4	7	1	5			3
		Quidius sp.							1	
		Quidius longiceps					1		1	1
		Sagola sp. 1	2				6			
		Sagola sp. 2			1					
		Sagola genalis	1	2	3	1	4	1		
		Scaphidiinae/Brachynopis l	1				6	3	2	2
		Sepedophilus laetulus	1	1		1	4	3		
		Silphotelus nitidus						1		
	Lucanidae	*Paralissotes reticularus*				1				
	Scarabaeidae	*Saphobious squamulosus/inflatipe*	3	5	10	25	4		3	4
		Saprosites communis?				1				
		Stethaspis longicornis	1				3		2	
	Byrrhidae	Byrrhidae sp.		1						
	Dryopidae	*Parnida agrestis*		1	1	4	3			
	Elateridae	Elateridae sp. 1				2			1	
		Elateridae sp. 2						1		
	Jacobsoniidae	*Saphophagus* sp.					1			
	Anobiidae	*Ptinus speciosus*	1							
	Cleridae	*Lemidia aptera*						1		
	Nitidulidae	Epuraea sp.				1				
	Cryptophagidae	*? Nr thortus/Paratomaria*					1			
		Micrambina						1	1	
		Picrotus thoracicus								1
	Erotylidae	*Thallis polita*						1		
	Endomychidae	*Holoparamecus* sp.		2						
	Coccinellidae	Coccinellidae sp.					1			
		Ryzobius rarus	1	4	4	3	4	2		
	Corylophidae	*Arthrolips oblongatus*						1		
		Holopsis	2	5						
		Holopsis/?orthoperus	1			1	3	7		2
	Corticaridae	*Aridius/Lithostygnus/Enicm*	1	7			11		1	4
		Aridius bifasciatus	5	8		1	7	6	2	
	Mycetophagidae	*Triphyllus?*	1	2			1			
	Ciidae	Ciidae sp.					2	3		
	Melandryidae	*Hylobia* sp.	1			1				1
		n.g. *Lyperocharis agilis*	1			2	2			8
	Zopheridae	*Ablabus/Glenenterla/Syncalus/Heterargus*		1	1		6	2		
		Epistranus sp.		1			2			
		Pristoderus bakewellii		2		1			1	1
		Pycnomerus sp.			1		1	2	1	
		Syncalus/Heteragus/Ablabus/Glei	1		1	1	1			
	Tenebrionidae	*Archaeoglenes costipennis*				1				
		Menimus n. sp.					1		1	
	Oedemeridae?	*Thelyphassa lineata*						1		
	Salpingidae	*Salpingus* sp.			1					
	Scraptiidae	*Nothotelus* sp.	1							
	Cerambycidae	*Somatidia/Nodulosoma/Ptinosoma*	1							
	Chrysomelidae	*Peniticus sp.*				1				
	Curculionidae	*?Stilbopsis polita*						1		
		Agacalles comptus					1			


Gaioxenus pilipalpis


Cercyon sp.


Inocatops sp.


Aleocharinae sp.


Paralissotes reticularus


Saphobious sp.


Parnida agrestis .


Ptinus speciosus


Rhyzobius rarus


Aridius bifasciatus


Pycnomerus sp.


Penticus sp.


Bryocatus sp.


Cossoninae sp.


Nestrius? sp.


Scelodolichus sp.

12.3 Department of Conservation guideline on translocations

- Deciding whether to proceed with a translocation proposal – a guide for community groups. DoC information sheet.

- Proceeding with a translocation proposal – a guide for community groups. DoC information sheet.

- Translocation – standard Operating Procedure. DoC information sheet.

Banner: Harlequin gecko

Information Sheet
December 2007

Proceeding with a translocation proposal — a guide for community groups

You will have prepared a proposal outline (refer to the information sheet '*Deciding whether to proceed with a translocation proposal*'), had feedback from DOC that the proposal is supported in principle and let DOC know you intend to proceed. This information sheet will help you prepare your proposal.

1. The Area Office will advise you who will be your main "DOC contact". This person will guide you through the translocation process, facilitate discussions with DOC staff and ensure your proposal moves through the process when it is submitted.

   Obtain information listed in the table below from your DOC contact person and run through the material with them. (Some of these items are available on the DOC website - www.doc.govt.nz - after April 2008)

   Note that these documents are updated regularly, paper copies you have may be out of date.

Top: South Island robin
Bottom: North Island robin

	ON DOC WEBSITE	TICK OFF THOSE YOU HAVE
*The **Translocation Standard Operating Procedure** (SOP) (approx 65 pages), ensure appendices are included.	✓	
*The **translocation proposal form**	✓	
*Example of a **well written** translocation proposal	✓	
* **Chapter 5** of the **Wildlife Health SOP** (OLDDM-766252) and **Translocation Disease Management Workbook** (OLDDM-724005), and list of wildlife health veterinarians OLDDM-724400).	✓	
Extracts from DOC Management Plans, Species Recovery Plans and Captive Management Plans relevant to the project.	☒	
Contact information for local iwi (for consultation)	☒	
DOC contacts list specific to your proposal: Pou Kura Taiao (Maori Relations Manager), Technical Support Officer(s), Biodiversity Programme Manager(s), Recovery Group Leader	☒	
*The **Assessment and feedback form** (DOCDM-88583)	✓	
OPTIONAL		
List of translocations relevant to your species/release location/source location – from DOC translocations spreadsheet. (DOCDM-33810)	☒	
*List of useful websites when planning a translocation. (DOCDM-81332)	✓	
Names of other **community groups** that have done translocations	☒	
Information on who to get technical advice from	☒	
An introduction to DOC and office address list www.doc.govt.nz then click "About DOC" and "Overview, Structure" and "Contact us"	✓	
* DOC staff could provide this on a CD.		

This information is part of the Department of Conservation's Translocation Standard Operating Procedure

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2. Complete the translocation proposal form, using the resources above for assistance.

   It is important to take the time to read through the Translocations SOP, which is designed to help guide you through the translocation process step by step.

   Meet with your DOC contact person to get advice on:

   » The proposal / process

   » Iwi consultation

   » Relevant contacts. Ask who to talk to for advice, or check with DOC staff on the appropriateness of the people you have lined up for advice – they may know of other relevant experts. Advice and mentoring may be available from another community group experienced in carrying out translocations.

   » Permit requirements etc.

   » What help are you expecting from DOC? Discuss this with staff to find out what they are able to provide.

   Completion of the translocation proposal is about planning and doing. While you complete sections in the proposal template you will be:

   » Designing your translocation

   » Researching habitat requirements and considering impacts on the source population and the suitability of the release site.

   » Seeking advice from and/or consulting with the Recovery Group, captive co-ordinators and experts.

   » Designing your disease management protocol with help from a wildlife health veterinarian. Disease screening/quarantine may be made easy through collaboration with a captive facility

   » Consulting with landowners, iwi, community groups

   » Finding out where to source supplies, funding

   » Applying for permits and approvals (gain before transfer takes place)

3. Submit the translocation proposal (including the disease management protocol) to your DOC contact person. The proposal will be assessed (usually by Technical Support staff in Conservancy Office) and further information or changes to the proposal may be requested.

Top: Powelliphanta snail, Maud Island.
Middle: North Island kokako

Figure 1: factors affecting approval

Giant weta, Aorangi, Poor Knights.

4. If required, make the necessary alterations to your translocation proposal and re-submit it to DOC.
5. The proposal will be approved or declined by the Conservator or General Manager.
6. After the transfer has been carried out, the Translocation SOP requires reports to be completed so that information can be shared and the success of future translocations improved.

Banner: Harlequin gecko

Information Sheet
July 2007

TRANSLOCATION

Standard Operating Procedure

GENERAL INFORMATION

Anyone wanting to translocate native animals and in some situations plants, will need to follow the process detailed in the Department of Conservation's Translocation Standard Operating Procedure (SOP).

WHAT SITUATIONS DOES THE SOP APPLY TO?

Transfers:

- from wild to captivity
- captivity to wild
- between wild locations.

WHO AND WHAT DOES THE SOP APPLY TO?

The requirements for DOC proposals and community groups are different.

Individuals and community group translocation projects

If a permit is required as part of a translocation project, the SOP applies, and a translocation proposal is required. Permits are required for translocation projects for:

i) Protected wildlife – specifically any wildlife categorised under the Wildlife Act 1953 as either "absolutely protected" or listed under the Second and Third Schedules of the Act (which list wildlife that have some protection), including eggs. Most native birds and all native lizards are absolutely protected.

ii) Any native land animals and plants being moved onto or from land administered by the Department of Conservation.

DOC translocation projects

The SOP applies, and a translocation proposal is required for:

i) Protected native land animals, specifically:

» any wildlife categorised under the Wildlife Act as either "absolutely protected" or listed under the Second and Third Schedules of the Act (which list wildlife that have some protection), including eggs.

» all threatened land invertebrates.

This information is part of the Department of Conservation's Translocation Standard Operating Procedure

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ii) Threatened native land plants. This includes projects that involve revegetation and restoration.

Note: The term "plant" means the whole plant, not seed or cuttings.

WHAT IS EXCLUDED FROM THE SOP?

- Wildlife declared to be game under first schedule of Wildlife Act.
- Injured and sick wildlife being treated under permits to temporarily hold sick and injured wildlife.
- Marine mammals.
- Aquatic life.
- Captive to captive transfers.

SOME KEY DEFINITIONS

Translocation: is the artificial movement of an indigenous species from one location to another. It covers the entire process including the transfer itself, monitoring and post release management.

Transfer: is part of the translocation; and is defined as the physical movement of a species from one location to another.

WHY DO TRANSLOCATIONS?

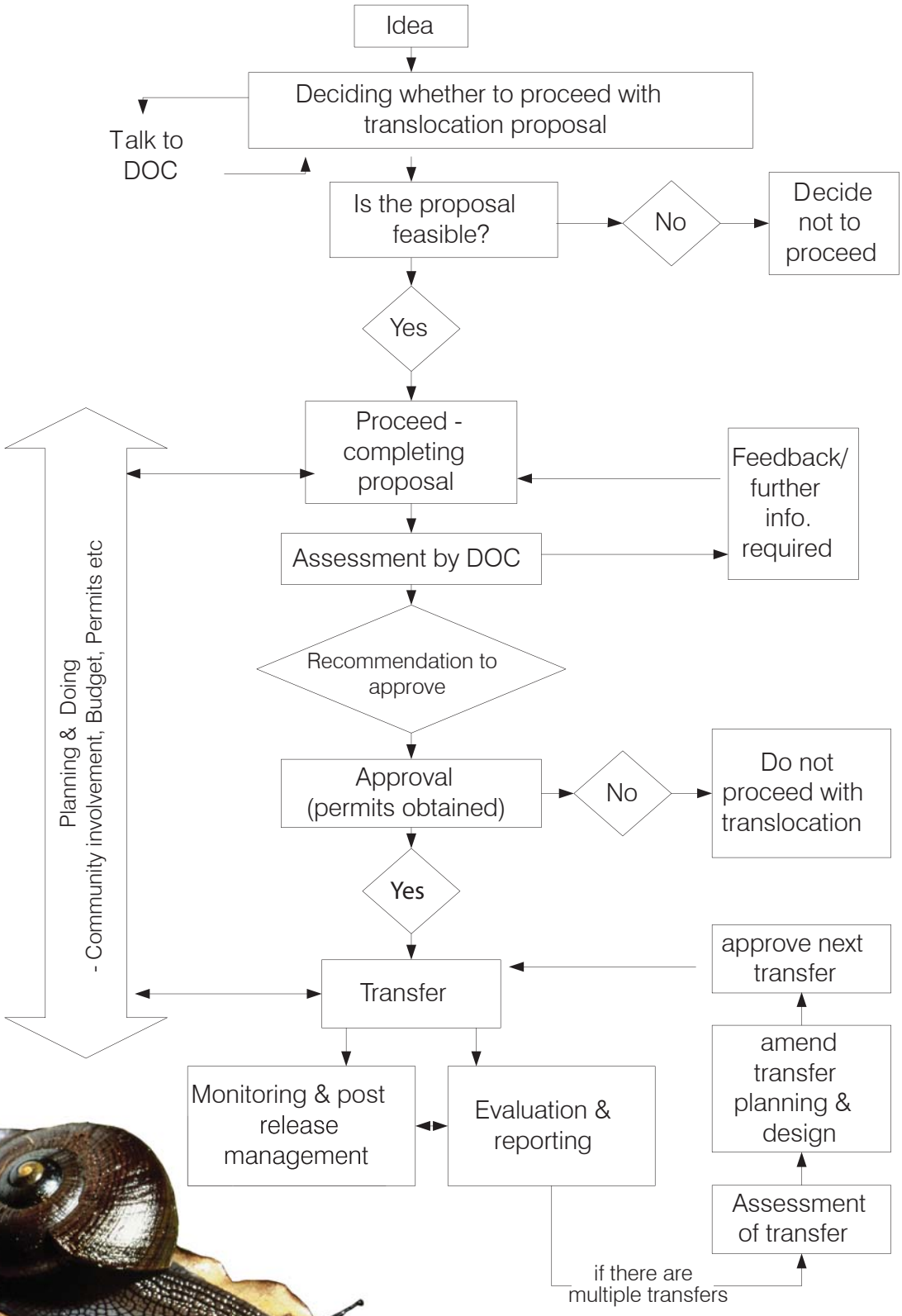
Translocations are carried out so that new populations can be established and existing populations can be boosted. Translocations may occur:

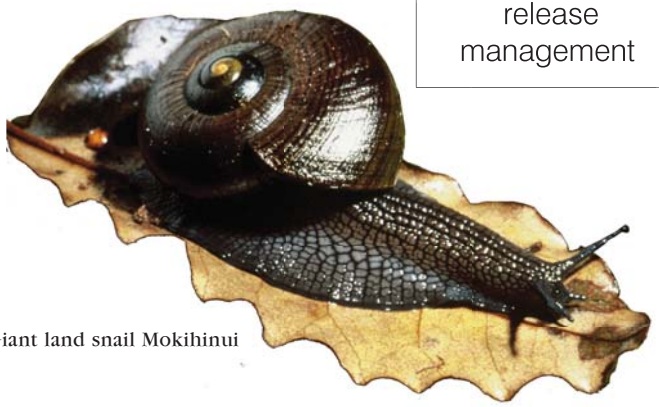
- as a short or long term measure to increase a species' chance of survival
- as part of a restoration programme
- to establish a species for a specific purpose such as advocacy, education or scientific study

Left: portable incubator used to transfer partially incubated Chatham Island black robin eggs.

Right: North Island kokako and cage used in transfer from Mapara to Kapiti Island, 1998

PROCESS FOR DEVELOPING AND IMPLEMENTING TRANSLOCATION PROJECTS





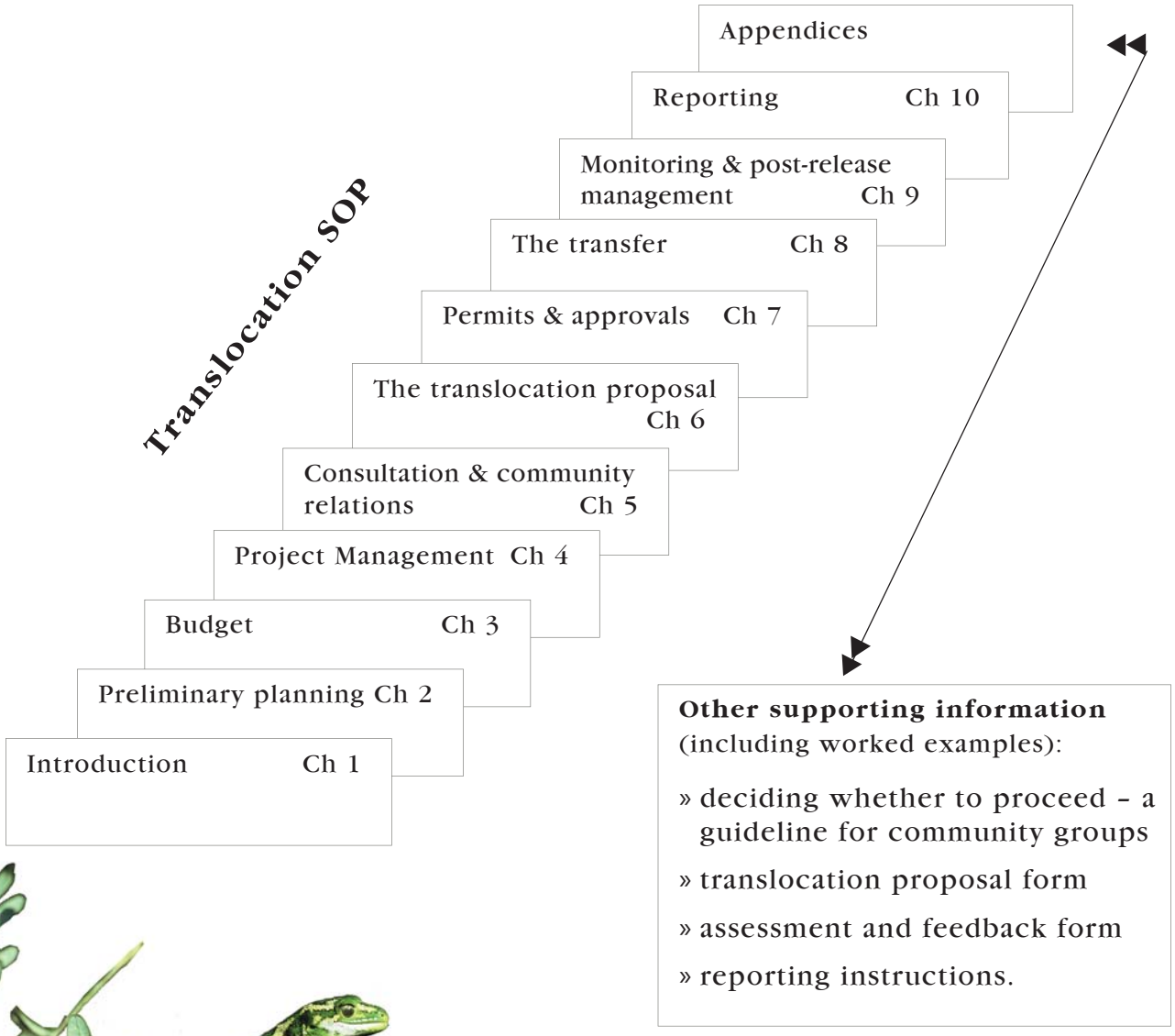
Giant land snail Mokihinui

MAP OF HOW THE INFORMATION IN THE TRANSLOCATION SOP FITS TOGETHER

The SOP contains key steps (in the chapters) for undertaking a translocation project, i.e. from planning through implementation to reporting. Within each chapter there are objectives and notes on what is covered etc.

Supporting information is found in the appendices including:

- deciding whether to proceed – a guide for community groups;
- translocation proposal form;
- assessment and feedback form;
- reporting instructions; plus
- examples of a completed translocation proposal form.



THERE ARE 4 KEY THINGS TO REMEMBER WHEN PLANNING A TRANSLOCATION:

- Achieving good decision making;
  - » in the planning and doing by the project team, and
  - » in providing information to help the decision maker.
- Learn from what we do by
  - » writing it down,
  - » considering the results; and
  - » making it available to others to achieve improvements.
- The proposal must demonstrate it is ecologically appropriate; and
- demonstrate it is sufficiently well planned to give it the best chance of success.

These things are the essence of the SOP, and if all involved keep them in mind this will ensure the proposal stays on track and is focused on what is important.

HOW DO I GET APPROVAL TO CARRY OUT A TRANSLOCATION?

i) Individuals and community groups:
  - » Use "Deciding whether to proceed – a guide for community groups".
  - » Prepare an outline of your proposal, for DOC to consider.
  - » Talk to DOC about the feasibility of your proposal and whether or not they support it in principle.
  - » Decide whether to proceed with your proposal.
  - » Get a copy of "Proceeding with a translocation proposal" and further information from DOC.

ii) Complete the translocation proposal. This is about planning and doing:
  - » Answer the questions in the translocation proposal form
  - » Design the disease management protocol with a wildlife health veterinarian
  - » Undertake consultation before submitting the proposal
  - » Apply for permits before submitting the proposal

iii) Submit the translocation proposal for assessment and approval.
  - » The proposal will be assessed using the "Assessment and Feedback Form".
  - » The proposal will either be approved or declined or sent back for further information.

Permits must be obtained before doing the transfer.

The SOP is updated regularly. The electronic version is the most up to date. Check the table of amendments at the front to make sure you have the latest copy.

REQUIREMENTS FOR REPORTING ON THE TRANSFER

The last requirement of the SOP is to complete reports after the transfer has been carried out

- Use the report form
- Send a copy to the Department of Conservation Office that approved the translocation.

Two types of report are required. One form is used for both reports:

- Transfer report (i.e. how did the transfer go?), due within 2 months of the transfer
- Monitoring report (i.e. how are they doing at their new site?), due either annually or after monitoring has been completed.

The reporting form provides a prompt for recording and evaluating the results of the translocation and communicating them.

In the reports, strong emphasis is placed on 'lessons learnt'.

Also send information on your translocation to the NZ Reintroduction Projects database, managed by Doug Armstrong.

http://www.massey.ac.nz/~darmstro/nz_projects.htm

Image description for pages iv and v: translocating jewelled green gecko from Otago.

This page above: Chatham Island black robin being transferred by boat to Pitt Island, 2004. Right: uploading Chatham Island petrel chicks in transfer boxes at the Caravan Bush fenceline, Pitt Island, 2003.

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Banner: Harlequin gecko

Information Sheet
December 2007

Deciding whether to proceed with a translocation proposal – a guide for community groups

USE THE FOLLOWING TO HELP YOU DECIDE WHETHER YOUR PROJECT IS FEASIBLE:

1. Read the 6 page information sheet on the Translocation Standard Operating Procedure (SOP).
2. Consider the questions in the section on page iii (over): "Outline of a translocation proposal". If you want to go on with the translocation, write an outline of the proposal using this section (2-3 pages - max).
3. Enquire at your local Area Office early on whether the Department might support the proposal in principle. Addresses are on the Department of Conservation (DOC) website www.doc.govt.nz or in the White Pages.

   To do this:

   » Firstly give your proposal outline to staff in your local DOC Area Office. (Area staff will need to discuss your outline with Technical Support staff in the Conservancy Office.)

   » Then arrange to meet with them so that you can discuss the outline and get initial feedback on:

   - whether it is 'ecologically appropriate' or 'justified'
   - whether it is consistent with DOC captive management policy etc
   - whether the Department might **support the proposal in principle**
   - any aspects of your project that DOC will be monitoring in the final proposal
   - how it fits with other conservation priorities.
4. Don't be discouraged, be aware that planning, consulting and getting approvals for a translocation can take a long time (allow a lot more time than you expect!) and involves:

   » Extensive planning and research (including developing disease management protocols) – you need the who, what, when, where, how and the why

   » Contacting technical experts – who may be away or unable to respond immediately

   » Consultation (landowners, iwi, community groups)

   Iwi resources and key people are often extremely stretched, so allow plenty of time for consultation. It is also good to make it easy for them e.g. provide transport costs, go to meet them etc. (Sandra Jack [ARC] pers. comm.)

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» Getting the proposal approved and obtaining permits

» Obtaining funding – to cover the costs of moving plants/animals; disease screening; equipment (translocation; management e.g. traps; monitoring); permits; management; monitoring etc.

Be conscious that:

» More than one transfer may be required to establish the species and maintain the genetic diversity/health of the population at the release site

» Doing your disease screening/quarantine can take a big chunk of time and money and requires a permit

» Your team may need training or upskilling in some techniques needed for the translocation

» Animal Ethics Committee approval may be required for some activities – the committees meet regularly but infrequently

» There may be ongoing management post-release e.g. improving predator control to incorporate updates from best practice

» There may be post-release monitoring required

» Where a long term commitment is required think about how you can meet it.

In other words, undertaking a translocation requires a big commitment.

DO YOU WANT TO PROCEED?

If you do contact your local DOC Area Office to let them know and get a copy of '*Proceeding with a translocation proposal*'.

Giant weta (*Deinacrida fallai*), Poor Knights Islands. DOC

Common skink (*Leioloopisma nigriplantare polychroma*), Rock and Pillar Range, Otago. DOC

Outline of a translocation proposal

1. Provide a title using this format (as much as you know so far):
   Proposal for transfer of <*what*> from <*where*> to <*where*> on <*when*>.

2. Explain why you want to do the translocation. If applicable explain the need to do it (e.g. the conservation problem you are trying to fix).

3. What do you want to achieve - for the plant or animal you want to translocate, and for the site that you are moving them to (e.g. species recovery, ecosystem restoration or community relations)?
   What is the desired outcome? In the: short term (e.g. 3 years); medium term (e.g. 10 years); long term (e.g. 30 years — what will the next generation see?)

4. How do you plan to undertake the translocation? (I.e. describe the transfer methods.)

5. Is the species likely to be available for translocation?
   - » Where might the plants/animals come from?
   - » How many might you need?
   - » Are there enough?
   - » Do you think more than one transfer will be required to establish this species?

   Some species may have a waiting list as demand exceeds the supply available from source populations … you could be joining a queue.

6. Describe the release site its location and size.
   Describe how the release location meets the needs of the species being moved (e.g. food, habitat, breeding requirements).
   - » Will you end up with a self-sustaining population at this site? (E.g. is the habitat large enough? Will there be dispersal issues?)

7. Describe the wider context of your proposal.
   - » Is there a management or restoration plan for the release site?
   - » If so how does this translocation contribute to it?
   - » Is your proposal connected to other transfers (e.g. there are plans to restore the site by translocating a range of different species to it)?

8. Was the species ever known to be at this site previously? (i.e. is it within its known historic range)
   - » If yes, why did it die out?
   - » Have the reasons for it dying out been addressed to prevent it happening again? (e.g. predators, forest clearance, competition)
   - » If this site is outside the known historic range of the species why do you want to move it there rather than to somewhere within its historic range?

9. Comment on likely long term impacts of the translocation on:
   - » other species (e.g. will there be significant competition for food etc; or significant predation on other species?)
   - » plans for future re-introductions (e.g. will the introduction of this species make it harder for other species to be introduced and establish at the site?)
   - » Will the translocation benefit other species or the site?
   - » Will the translocation make it harder to manage problem weeds or animal pests at this site?

10. If this proposal involves any captive holding or breeding:
    - » is there already a captive breeding population of this species?
    - » if a new captive population needs to be set up, what will be done with the captive population in the long term?
    - » and does the captive programme have an end point where all individuals will be released?

11. Who are you? If you represent a community group undertaking this project provide some information to introduce the group.
    - » Tell us who you think your project team will be (as much as you know so far), and their relevant skills/experience and role in this translocation.
    - » If the proposal were approved, what funding and resources (include volunteers, sponsorship) do you have to carry it out?

A worked example of an outline can be found on the DOC website www.doc.govt.nz (after April 2008), or obtained from any local DOC office.

Campbell Island teal transfer, 2004. Clockwise: transfer box, holding pen, harness, banded birds with transmitters, birds in temporary transfer box, radio tracking, banded bird with transmitter.

Pycroft's petrel transfer, 2003. Bottom left to right: transfer to artificial burrows on Cuvier Island, feeding a chick, returning the chick to artificial burrow. All photos DOC.